

STUDIES ON AUSTRALIAN MOLLUSCA. PART X.

BY C. HEDLEY, F.L.S.

(Plates vii.-x.)

(Continued from Vol. xxx, p. 546.)

TROPHON PAIVÆ CROSSE.

(Plate ix., fig. 18)

A young shell, 3 mm. in length, of four whorls, is here shown. Two nepionic whorls are smooth and globose, the initial one set obliquely. Subsequent whorls are ornamented by about a dozen erect radial lamellæ, on the shoulder puckered into a spout and descending obliquely from whorl to whorl. As growth proceeds, the lamellæ do not enlarge in proportion, but multiply in number. Spiral cords appear on the fourth or fifth whorl, enlarge, and, on the sixth, predominate over the radials, which decrease to mere scales.

In early life the shell thus appears as a regular *Trophon*, but modification of sculpture in maturity has masked this affinity and induced authors to assign it to other genera. Hutton included *T. paivæ** in a genus *Kalydon* he had framed for Trophon-like shells without varices. In our waters that genus appears to me to be represented by *Ricinula adelaidensis* Crosse, and *Purpura neglecta* Angas. The apex of the latter† is quite different. In Moreton Bay *T. paivæ* appears to closely approach if not to merge into a large form which I take to be *Buccinum funiculatum* Reeve‡ and *Latirus strangei*§

* Trans. N.Z. Inst. xvi. 1883 (1884), p. 226.

† Kesteven, these Proceedings, 1902, xxvi. p. 714, Pl. xxxvi. f. 2.

‡ Conch. Icon. iii. Buccinum, 1846, Pl. viii. f. 61.

§ A. Adams, Proc. Zool. Soc. 1854, p. 316.

VERMICULARIA CAPERATA Tate & May.

(Plate x., figs.37-38.)

Some notes on this species have already appeared in these Studies (vi., p.19). The protoconch, I find, consists of a small brown semitransparent Rissoa-like shell of $2\frac{1}{2}$ whorls, 1.4 mm. long. A sudden change in form and texture expresses the change to adult life. The larva settles aperture downwards, shell prostrate. The first irregular adherent whorl encircles, then mounts upon and buries the protoconch. Thus the first adult coil is at right angles to the larval axis as in *Turbonilla*.

PYRENE PLURISULCATA Reeve.

Columbella plurisulcata Reeve, Conch. Icon. xi. 1859, Pl. xxxvi. f. 233. *Æsopus filiosus* Angas, Proc. Zool. Soc. 1867, p. 111, Pl. xiii. f. 6, *vide* S. Pace, Proc. Malacol. Soc. v. 1902, p. 83.

The locality of this species was unknown to Reeve, whose name therefore escaped inclusion in Australian lists. The synonym of Angas was preoccupied in *Columbella* by Carpenter, Duclos and Dujardin. It was corrected or misreported in the Zoological Record as "filamentosus." Tenison-Woods* noted *C. filiosa* to be a rare Tasmanian shell. Pritchard and Gatliff† record it from Western Port. Brazier took a sinistral individual in Sydney Harbour.‡

THAIS GEMMULATA Lamarck.

Purpura gemmulata Lamarck, Anim. s. vert. vii. 1822, p. 239; Ency. Méth. 1816, Pl. 397, f. 3, a, b. *Purpura mancinella* auctorum non Linné.

Hanley has recorded§ the existence in the Linnean Collection of two adult shells marked "Murex mancinella." These conform to the original diagnosis, and must be regarded as types. But

* Proc. Roy. Soc. Tas. 1877, p. 32.

† Proc. Roy. Soc. Vict. xviii. 1906, p. 48.

‡ These Proceedings (2), ix. 1895, p. 561.

§ Hanley, Ips. Linn. Conch. 1855, p. 295.

they answer, he writes, to the *Ricinula spectrum* of Reeve and not to the shell universally accepted as *Purpura mancinella* Linné.

In default of its proper title, the Linnean species has received numerous epithets; thus it was named, in 1798, *Drupa carnus* by Bolten; in 1832, *Purpura elata* by Blainville; in 1839, *Purpura martiniana* by Anton; and in 1846, *Ricinula spectrum* by Reeve. Under Blainville's name the species is recorded from North Queensland by Melvill & Standen.*

But the shell to which the name *mancinella* has been erroneously transferred has been left that title in undisputed possession. Searching for a name to inherit its estate, I find *Purpura gemmulata* to be apparently the only claimant. Under the old style the species has been recorded by Brazier† from several Australian stations.

CLAVA SINENSIS Gmelin.

Murex sinensis Gmelin, Syst. Nat. xiii. 1791, p.3542. *Cerithium obeliscus* Bruguière, Ency. Méth. Vers, (2), 1792, p.472.

Most monographs give this species under Bruguière's name, but Pilsbry has pointed out that Gmelin's has priority. Both base their species on the same reference,‡ so the repetition is obvious. Bolten renamed it *Strombus muricatus*.

Menke recorded it§ from N.W. Australia, but it has hitherto escaped attention on the east coast. It is not rare in tropical Queensland, for I have taken it on the Palm, Green and Hope Islands.

ARGOBUCCINUM SUCCINCTUM Linné.

Murex succinctus Linné, Mantissa ii. 1771, p.551. *Murex clandestinus* Chemnitz, Conch. Cab. xi. 1795, p.127, Pl.195, figs. 1856, 1857; *vide* Hanley, Ips. Conch. Linn. 1855, p.456.

* Melvill & Standen, Journ. Linn. Soc. Zool. xxvii. 1899, p.163.

† Brazier, Journ. of Conch. ii. 1879, p.187.

‡ Martini, Conch. Cab. iv. 1780, p.325, Pl.157, f.1489.

§ Moll. Nov. Holl. Specim. 1843, p.19.

The only reference in literature to this species as Australian seems to be that of Tryon* who curiously omits all the localities supplied by his predecessors, and cites only "Australia."

I have not personally collected a specimen, but I purchased an example from Mr. A. F. Hemsley, of Cooktown, Queensland, who told me that it was obtained in the neighbourhood of that port.

Dr. Dall has instituted the subgenus *Paralagena* for the species. †

BUCCINUM ASSIMILE Reeve.

Under the name of *Cantharus (Tritonidea) assimilis*, Angas ‡ described this species as found "under stones at low water, Watson Bay." His account suggested that he gathered what is now known as *Tritonidea australis* Pease. I therefore enquired of Mr. Smith if these names were synonymous. He replied that the species are distinct, but that Reeve's *assimile* is a synonym of the Mediterranean shell *Purpura picta* Scacchi. Bucquoy, Dautzenberg, and Dollfus § wrongly cite it as a synonym of *Pisania d'Orbigny* Payr.

So *Buccinum assimile* can be struck off the list of Australian shells. Another Mediterranean shell imposed upon our fauna is *Clathurella purpurea* Montagu, which, under the name of *C. reticosa*, Adams & Angas || described as from Middle Harbour.

Again, Bertin ¶ has reported the West Indian *Donax denticulatus* Linné as from Port Stephens.

STROMBUS CAMPBELLII Griffith & Pidgeon.

Griffith & Pidgeon in Cuvier's Animal Kingdom, Ed. Griffith, Vol. xii. 1834, p. 600, Pl. xxv. fig. 6.

Authors generally (for instance, Watson, Chall. Exped. Zool. xv. p. 418) have applied to this species the name *Strombus*

* Man. Conch. iii. 1881, p. 15.

† Smithsonian Miscell. Coll. 47, 1904, p. 132.

‡ Proc. Zool. Soc. 1867, p. 187.

§ Moll. Mar. Roussillon, i. 1882, p. 27.

|| Proc. Zool. Soc. 1863, p. 420.

¶ Nouv. Arch. Mus. (2), iv. 1881, p. 82.

campbellii Gray. Yet Gray does not appear to have referred to it in his writings. The real authors of the name are Griffith & Pidgeon.

Kuster* has erroneously identified Chemnitz Conch. Cab. (1) Pl.157, fig.1496, as *S. campbellii*. On comparison with Kiener, Strombus, Pl.25, figs.1-1a, it will be seen that the figure of Chemnitz represents not *S. campbellii* but *S. columba* Lamarck. Since Bolten† corrected the defective nomenclature of Chemnitz by supplying a binomial name, *Lambis plicata*, for this fig.1496, it follows that *S. columba* Lamk, should be superseded by *S. plicata* Bolten. Brazier has recorded‡ *S. columba* Lamk., from Darnley Island, 25 faths.

In the last Part of these Studies (ix. p.523) I noted that *Alaba sulcata* Watson, was based on an early stage of *S. campbellii*.

Though not often seen on the beach, *S. campbellii* commonly occurs in the dredge all along the Queensland coast. The most southern record is Port Stephens, N.S.W.§ Reeve states|| that Jukes obtained it at Sandy Cape, Queensland. I saw it in the Capricorn Islands. The "Alert" took it¶ at Port Molle. Forbes** reports it from off Cape Upstart. Schmeltz†† noted it from Port Denison. The "Chevert"‡‡ at Cape Grenville and Long Island. Haddon, between Hammond and Wednesday Islands.§§ From the Gulf of Carpentaria, Roth records||| that the animal is eaten and the shell used for baby-rattles at the mouth of the Batavia River, where it is called "yung-ko" in the Nggerikudi language.

* Conch. Cab. 2nd Ed., Strombus, 1845, p.69.

† Mus. Bolt. (2) 1798, p.65.

‡ These Proceedings, i. 1877, p.292.

§ Angas, Proc. Zool. Soc. 1877, p.185.

|| Conch. Icon. vi. 1854, Strombus, sp.45.

¶ Smith, Zool. Coll. "Alert," 1884, p.58.

** Voy. "Rattlesnake," ii. 1852, p.365.

†† Cat. Mus. Godeff. v. 1874, p.142.

‡‡ Brazier, these Proceedings, i. p.292.

§§ Melvill and Standen, Journ. Linn. Soc. Zool. xxvii. 1899, p.165.

||| North Queensland Ethnog. Bull. iii. 1901, p.19.

FICUS COMMUNIS Bolten.

Ficus communis Bolten, Mus. Bolt. (2), 1798, p.148.

Considerable confusion has attended this genus. For Hanley* has shown that Linné confounded three species in the original *Bulla ficus*; while Smith† has discussed the obscurity of the Lamarckian species. By reviving the neglected name of Bolten‡ we gain not only by restoring the oldest name, but by avoiding the dispute of whether the subsequent name of Lamarck was bestowed on the Australian or the American shell.

Angas recorded this species as *Sycotypus reticulatus*§ from the mouth of the Macleay River. It has subsequently been taken as far south as Port Stephens. Along the Queensland coast it is not rare on sandy beaches. I dredged a fragment off the Hope Islands near Cooktown.

Under the name of *Sycotypus ficoides*, Brazier notes it|| from 15-30 fathoms off Darnley Island, where, so Jukes writes,¶ the natives call it "mabaer."

West of Torres Strait this species is replaced by *F. tessellatus* Kobelt.

In the Australian Tertiary the genus is represented by *F. altispira* Pritchard,¶¶ from Table Cape, Tasmania. This seems additional evidence that the temperature there was then higher than now.

MITRA CARBONARIA Swainson.

Swainson, Bligh Cat. Append. p.10, 1822 (reprinted Exotic Conchology, 1841, p.37). *Mitra melaniana* Swainson (not Lamarck), Zool. Illustr. 2nd Ser., iii. 1832, Mitra, Pl.i. f.1.

In 1788 Chemnitz published, under a polynomial name, figures and description of a Mitra from the incongruous localities of the Guinea coast, Greenland and Tranquebar. Probably he had

* Hanley, Ips. Linn. Conch. 1855, p.206.

† Smith, Journ. of Malac. iii. 1894, p.66.

‡ Founded on Knorr, Verg. Pt.iii. Pl.xxiii. f.1.

§ Angas, Proc. Zool. Soc. 1877, p.182.

|| Brazier, these Proceedings, i. 1877, p.235.

¶ Jukes, Voy. "Fly," i. 1847, p.189; ii. p.286.

¶¶ Pritchard, Proc. Roy. Soc. Vict. viii. n.s. 1896, p.85, Pl.iii. f.2-3.

several species before him, one of which was *Volutomitra grönlandica* Beck. Binomial writers have bestowed on his shell the following names—*Voluta nigra* Gmelin, 1791; *Mitra castanea* Bolten, 1798; and *Mitra melaniana* Lamarck, 1811. To this an Australian shell was subsequently referred.

But at that early date Chemnitz had received no Australian shells except those collected by Captain Cook's party. Figs. 1430 and 1431 of Pl. 151 of Chemnitz, exhibit a shell with less pointed spire, more rapidly increasing whorls, fewer and less oblique plications—clearly a distinct species from the Australian shell usually known as *M. melaniana*.

The Australian shell appears to have been first distinguished by Swainson in 1822. Ten years afterwards he resumed the study of it, stating that Lamarck had confused two species under one name; and that, whereas he, Swainson, had first intended to call the Australian one "*carbonaria*," leaving "*melaniana*" for the other, further consideration induced him "to alter this arrangement," and to figure "a full-sized specimen received from Australia" of *carbonaria* under the title of *M. melaniana* Lamarck. The type of *M. carbonaria* was in the Manchester Museum.

Mr. E. A. Smith writes to me of *Volutomitra digna* A. Adams,* "I agree with Tryon in placing this shell with *M. nigra* = *melaniana*. I am quite sure that it is merely an immature example of that species."

As *Mitra nigra*, Angas recorded the species from Sydney Harbour,† and, as *M. melaniana*, Pritchard & Gatliff mention it from Eastern Victoria.‡

LITIOPA MELANOSTOMA Rang.

Rang, Ann. Sci. Nat. xvi. 1829, p. 307.

(Plate x., figs. 30-31.)

Different views on the division of *Litiopa* are held by various writers. Thus Watson§ regards it as a single "species of

* Proc. Zool. Soc. 1854(1855), p. 135; Thes. Conch. iv., *Mitra* p. 6, Pl. 361, f. 115.

† Proc. Zool. Soc. 1867, p. 193.

‡ Proc. Roy. Soc. Vict. xi. 1899, p. 186.

§ Chall. Rep. Zool. xv. 1886, p. 572.

universal distribution in warm seas," while Locard* separates several species.

No one has yet remarked the occurrence of *Litiopa* in Australian seas. But I find a member of it occurring at Sydney and several points along the Queensland coast—Green Island, Hope Island, and Eclipse Island. This appears to be the same as one I obtained from New Caledonia, and therefore determined as *L. lymnophysa* Melvill & Standen.† The species is subject to considerable variation, besides a difference, probably sexual, of breadth, the colour ranging from white spotted with brown to uniform cinnamon-brown. Aged examples produce a thick bilobed callus ridge on the columella. The axial furrow, or incipient umbilicus, is more apparent in some instances than in others, and at its greatest development is bordered by a funicular ridge.

Dr. J. Richard, the Director of the Oceanographic Museum of Monaco, has kindly assisted me with examples for comparison of *L. melanostoma* from N. lat. 31° 38', W. long. 42° 38', in the Sargasso Sea. Certain differences appear. The Sydney shell is larger, comparatively broader, and develops an axial furrow and stronger columellar callus than the Atlantic shells. In consideration of the great range of variability in all pelagic shells, for instance in *Ianthina* and *Cavolina*, it seems to me best to record the Sydney shell as a form of Rang's species.

My figure is derived from a specimen 4.5 mm. long and 2.4 mm. broad, taken by the late Mrs. Starkey on Balmoral Beach, Sydney.

A good recognition mark is supplied by the exquisitely sculptured protoconch.

SCISSURELLA ROSEA, Hedley.

Hedley, Records Austr. Mus. v. 1904, p.90, f.17.

I find that this species, originally described from New Zealand, occurs also on the hither side of the Tasman Sea. Specimens

* Moll. Exped. "Talisman," i., 1897, pp.498-500.

† Melvill & Standen, Journ. of Conch. viii. 1896, p.305, Pl.xi. f.72.

were collected by my wife at Eagle Hawk Neck, Tasmania; and Mr. J. H. Gatliff has sent it to me from Flinders, Victoria. The latter he recorded as *S. obliqua* Watson,* which Kerguelen shell seems from its figure to be of different contour. As in *Schismope atkinsoni*, the sculpture varies from cancellate to nearly smooth. The rosy colour of the apex is fugitive.

HALLOTIS SCALARIS Leach.

Padollus scalaris Leach, Zool. Miscell. i. 1814, p.66, Pl.28.

In the last Part of these Studies (p.521) it was noted that, whereas, in the latest monograph, this species was called *Haliotis tricostalis* Lamk., an earlier name, *Padollus rubicundus* Montfort, should be preferred. I now find that *Haliotis rubicundus* is pre-occupied by Bolten† for another species. It is therefore necessary to resume the above name by Leach, which also antedates that of Lamarck.

MONILEA APICINA Gould.

Gould, Proc. Bost. Soc. Nat. Hist. viii. 1861, p.14.

This unfigured species, collected between 1853 and 1856 in Port Jackson by W. Stimpson, has never been recognised by Australian conchologists. Dr. Paul Bartsch has kindly sent me a photograph of the type preserved in the U.S. National Museum. This portrait enables me to refer Gould's species to *Monilea angulata* A. Adams.‡

TROCHUS TINCTUS Watson.

Watson, Chall. Rep. Zool. xvi. 1886, p.63, Pl.xvii. f.2.

Watson's account seems to apply so closely to an immature *Calliostoma allporti* that I think his name should be reduced to a synonym of the species Tenison-Woods described ten years previously.

* Prit. & Gatliff, Proc. Roy. Soc. Vict. xv. 1903, p.181.

† Mus. Bolt. (2), 1798, p.14.

‡ A. Adams, Proc. Zool. Soc. 1851, p.190.

CANTHARIDUS EXIMIUS Perry.

Bulimus eximius Perry, Conchology, 1811, Pl.32, f.2.

For this shell Perry simultaneously proposed the names of *Bulimus carinatus* and *B. eximius*. It is interesting to note that Férussac* suggested that *B. carinatus* Perry appeared to be not a land- but a sea-shell.

On the ground that *B. carinatus* had page precedence, not priority, over its fellow, Messrs. Pritchard & Gatliff have selected† it for service, thus leading Dr. Verco‡ astray also. But Pilsbry has explained§ that *B. carinatus* Perry cannot stand on account of the earlier *Bulimus carinatus* Bruguière, 1789.

Dr. Bartsch kindly forwarded a photograph of Gould's type of *Elenchus ocellatus*,|| collected by W. Stimpson in Sydney Harbour. This enables me to identify it as a young *C. eximius*. The white dashes, to which the trivial name refers, commonly occur on Sydney examples.

This shell is shown in an aboriginal Tasmanian necklace in the Atlas to Péron's 'Voyage' (1824, Pl.xii. f.5). Such necklaces are also described by Ling Roth.¶ Modern local jewellers now employ it for various forms of trinkets. The Rev. T. Dove wrote** "a cluster of glistening shells was termed a merrina." Tasmanian fishermen, so I am told by Mr. W. L. May, still speak of *C. eximius* by this aboriginal name.

C. eximius is illustrated on p.220 of Swainson's Malacology (1840). Tenison-Woods thought†† that the *Elenchus splendidulus* of the same author‡‡ was identical, but I would regard that name as a synonym of the New Zealand *C. opalus* Martyn.

* Tabl. Syst. Anim. Moll. 1821, p.88.

† Proc. Roy. Soc. Vict. xviii. 1906, p.65.

‡ Trans. Roy. Soc. S.A. xxxi. 1907, p.350.

§ Nautilus xvi. 1902, p.72.

|| Proc. Boston Soc. Nat. Hist. viii. 1861, p.14.

¶ Aborigines of Tasmania, 2nd Ed. 1899, p.133.

** Tasm. Journ. Nat. Sci. i. 1842, p.252.

†† Proc. Roy. Soc. Tasm. 1877, p.41.

‡‡ *Loc. cit.* p.352, footnote.

The radula of *Elenchus badius* Wood, is figured and described by Troschel.* The species spreads along the whole of extra-tropical Australia. On the east coast I have seen it from Caloundra, and on the west, Adams† cites it as *P. lineata* from Swan Point.

The shape of this shell is moulded by its environment, for the mollusc lives not on rocks but ever afloat on swaying bands of kelp. The stream has no grip on the smooth lines of *C. eximius*, as it would have on a normal keeled pyramidal *Cantharidus*. Some land-shells living on twigs and leaves have assumed a like form under like conditions.

CANTHARIDUS LINEOLARIS Gould.

Gould, Proc. Boston Soc. Nat. Hist. viii. 1861, p.14.

A photograph of Gould's specimen in the U. S. National Museum shows this to be the shell to which H. & A. Adams, twenty-two months later, gave the name of *Leiopyrga picturata*, and which was first figured in the Zoology of the "Alert."

Another photograph from the U.S. National Museum supports my conjecture‡ that *Bankivia lugubris* Gould, is a colour-variety of *Cantharidus fasciatus* Menke.

CALLIOSTOMA ARRUENSE Watson.

Trochus (Ziziphinus) arruensis Watson, Journ. Linn. Soc. Zool. xv. 1880, p.91; Chall. Rep. Zool. xv. 1886, p.57, Pl.vi. f.5. *Cantharidus torresi* Smith, Zool. Coll. "Alert," 1884, p.72, Pl.vi. f.a.

I owe the above synonymy to my correspondent, Mr H. B. Preston, who bases it on an inspection of types. It is a parallel case to *Pleurotoma sterrha* and *P. torresiana*, dealt with in the last Part of these Studies, in which a "Challenger" preliminary description was overlooked in naming an "Alert" species. Prof. Haddon took this shell at Murray Island, Torres Straits. It occurred to me at Masthead Island, but was misnamed *C. similare*

* Gebiss d. Schneck. ii. 1879, p.236, Pl.xxiv. f.4.

† Proc. Zool. Soc. 1851 (1853), p.154.

‡ Mem. Austr. Mus. iv. 1903, p.334.

in my list. I have seen a form of *C. arruense* from New Caledonia.

CAMITA ROTELLINÀ Gould.

Trochus (Monodonata) rotellinus Gould, Proc. Boston Soc. Nat. Hist. iii. 1860, p.180; U.S. Expl. Exped. p.191, Pl.xiii. f.222.

A single worn shell which I found at Green Island, North Queensland, enables me to add a genus to the Australian fauna.

ASTRALIUM PAGODUS Ten.-Woods.

Ten.-Woods, these Proceedings, iv. 1879, p.110.

These notes on obscure Australian Trochidæ may be concluded by remarking that the above name by Tenison-Woods was based on a juvenile example of *Trochus niloticus* Linné. The young of this shell differs from the adult whorls in form and sculpture. The error of regarding it as a distinct species had previously been perpetrated by Chemnitz and Lamarek.* Such a mistake is more excusable in foreign than in local workers.

CAPULUS NUTATUS, n.sp.

(Plate ix. figs.15-16.)

Shell small, rather thin, bilaterally symmetrical, low, broadly ovate. Apex at about four-fifths of the length, on the median line, minute, almost vertically inrolled. Colour rufous-brown, either uniform or variegated by pale rays. Sculpture: coarse concentric growth-lines are corrugated by numerous delicate radial folds. Length, 5·6; breadth, 4·8; height, 3 mm.

Hab.—Not uncommon in shell-sand around Sydney.

At first acquaintance I had regarded this as not adult, but a considerable series now convinces me that it does not grow appreciably larger than here described. The records from Sydney of *Cochliolepas subrufa* by Angas† and of *Hipponyx danieli* by Henn and Brazier‡ were doubtless based on the species under discus-

* *T. marmoratus* Déshayes, Anim. s. vert. 2nd ed. ix. 1843, p.139, footnote.

† Proc. Zool. Soc. 1867, p.212.

‡ These Proceedings (2), ix. p.170.

sion, and on the assurance of its immaturity. From juvenile examples of that species (now known as *Capulus australis* Lamk.) the novelty appears to differ by greater symmetry and less height in proportion to breadth. *Amalthea coxi* Sowerby,* from Port Stephens, seems to me not molluscan, but the shell of a barnacle.

RISSEA PRAEDA, n.sp.

(Plate x., fig.35.)

Shell small, solid, ovate-conic, imperforate. Whorls six, rather rapidly increasing. Colour uniform pale ochreous. Sculpture: the base as far as the periphery is smooth. Above the periphery are eleven massive perpendicular ribs which continue from whorl to whorl to the antepenultimate. The deep wide interstices appear at the periphery to be gouged out of the shell-substance. Both ribs and interstices are smooth. Apex bare of sculpture. Aperture a little oblique, ovate, angled above, externally protected by a heavy outstanding varix, inner lip with a thickened reflected edge. Length, 3.55; breadth, 2.15 mm.

Two specimens collected in Middle Harbour by the late Mrs. Starkey.

Type to be presented to the Australian Museum.

RISSEA INCOMPLETA, n.sp.

(Plate x., fig.36.)

Shell small, ovate-globose, rather thin, glossy, translucent, imperforate or very narrowly perforate. Whorls five. Colour uniform flesh-pink, varix white. Sculpture: about twenty-one sharp narrow perpendicular ribs, parted by broad shallow interstices, traverse the last two whorls from suture to periphery, where they are abruptly closed by a waved spiral cord. On the base the ribs faintly reappear. Upper whorls and base smooth. Aperture subquadrate, anteriorly subchannelled. Columella

* Proc. Malacol. Soc. viii. 1908, p.17, Pl.i. figs.9-11.

vertical, nearly straight, outer lip protected by a massive projecting varix. Length, 2.75; breadth, 1.7 mm.

Hab.—Middle Harbour (the late Mrs. C. T. Starkey). Rare.

Type to be presented to the Australian Museum.

Since drawing up the above description, I have found numerous specimens in dredgings taken by Mr. W. L. May and myself, in 100 fathoms, seven miles east of Cape Pillar, Tasmania.

RISOA PROCINCTA, n.sp.

(Plate x., fig.34.)

Shell small, thin, glossy, conical, perforate. Whorls four, rounded and deeply constricted at the sutures. Colour: on each whorl two spiral alternating bands of cream and pale brown. Sculpture, faint growth-lines. Aperture pyriform, rounded below, angled above, outer lip simple, inner reflected. Length, 2.55; breadth, 1.45 mm.

Hab.—Middle Harbour (Mrs. Starkey; one specimen).

Type to be presented to the Australian Museum.

RISOA IMBEX, n.sp.

(Plate x., fig.33.)

Shell elongate-conic, rather solid, perforate, protoconch turbinate, suture channelled, each whorl overhanging the next in imitation of a cone-in-cone structure. Colour dull white. Sculpture: along the periphery of each whorl runs a deep groove, bordered by a ridge on each side. On the base are two or three raised lines. With these exceptions the shell is smooth. Aperture almost entire, roundly oval, broadly reflected throughout, the reflection notched on the right by the peripheral groove, and on the left extended over a narrow axial perforation. Length, 3.6; breadth, 1.6 mm.

Hab.—Middle Harbour (the late Mrs. C. T. Starkey; a few specimens).

Type to be presented to the Australian Museum.

This species is related to a small group of spirally ribbed shells — *R. tenisoni* Tate, *R. layardi* Petterd, *R. agnewi* Ten.-Woods, and *R. unilirata* Ten.-Woods, among which it stands nearest to the last.

ODOSTOMIA IGNAVA, n.sp.

(Plate x., fig.32.)

Shell small, narrowly ovate, solid, glossy. Colour white. Nuclear whorls small, half-sunk in the topmost adult whorl. Postnuclear whorls six, regularly increasing, distinctly shouldered above, and rather flattened at the periphery. Last whorl large, rounded on the base. Sculpture: there are no spirals; on the earlier whorls are faint close ribs which gradually disappear on the older whorls. Aperture rather narrow, pinched above, rounded below. Fold scarcely visible. A broad and thick callus spread on the inner lip. Length, 4.85; breadth, 2.3 mm.

Hab.—Middle Harbour, Sydney (type; self); Trial Bay, N.S.W. (C. F. Laseron).

The compact shape and feeble fold lend to this shell the aspect of a Rissoa. It apparently belongs to the subgenus *Heida* Dall & Bartsch.*

EULIMA TOPAZIACA, n.sp.

(Plate x., fig.29.)

Shell small, narrowly ovate, polished, semitransparent, imperforate. Colour white. Whorls five, rapidly increasing, wound obliquely, contracted at the suture, apex blunt. Sculpture none. The columella and base of each spire-whorl visible through the shell. Aperture pyriform, rounded below, contracted and angled above where it tends to separate from the body-whorl. Lip simple, columella reflected, narrow. Length 2.55; breadth, 1.25 mm.

Hab.—Middle Harbour (one specimen collected by the late Mrs. Starkey).

Type to be presented to the Australian Museum.

* Proc. Biol. Soc. Washington, xviii. 1904, p.13.

Since writing the above I have received from Mr. F. H. Baker specimens coloured uniform brown, which he collected at Port Albert, Victoria.

The shape of this eccentric *Eulima* is like that of *Rissoa*.

MANGELIA HILUM, n.sp.

(Plate ix., fig.17.)

Shell minute, acicular, thin. Colour amber-brown, passing to purple on the apex. Whorls five, wound obliquely, the first minute, the last two-thirds of the whole shell. Sculpture: fine spiral grooves which become more crowded anteriorly. Aperture long and narrow, suddenly contracted anteriorly, sinus deeply excavate, a thin sheet of callus spread on the columella, canal broad, short, a little recurved. Length, 3.85; breadth, 1.25 mm.

Off Vacluse, Sydney Harbour (J. Brazier; one specimen from 12 fathoms). To be presented to the Australian Museum.

Since writing the above, the species has occurred in a collection dredged by Mr. W. L. May and myself, in 100 fathoms, seven miles east of Cape Pillar, Tasmania.

ARCA TRAPEZIA Deshayes.

Dr. H. A. Pilsbry informs me that the American localities assigned to *Arca trapezia* and its synonyms are wrong. He writes, "Semblas is evidently San Blas on the west coast of Mexico; but no such shell is known from that region, and we have nothing in American waters which could be reasonably identified with *trapezia*." Dr. Lamy, who has recently reviewed the genus, concludes* that the Australian shell is *A. trapezia*. Since the evidence of locality, on which I relied, proves erroneous, I now accept the name *trapezia* for the species discussed (*ante*, Vol.xxix. p.203) as *Arca lischkei*.

The old name for Darling Harbour, N.S.W., was Cockle Creek, in reference to the *A. trapezia* found there in abundance by the early pioneers. The locality of Akaroa, New Zealand, given by Dr. Lamy (p.248) for this species, is certainly an error.

* Journ. de Conch. liii. 1906, p.333, footnote, and lv. 1907, p.246.

LISSARCA PICTA Hedley.

Austrosarepta picta Hedley, these Proceedings, xxv. 1899, p.430.

Not finding any genus to suit this shell, I proposed a new one for its reception. The figure of the type of *Lissarca** is useless for identification. But later I recognised my genus in an excellent illustration of *Lissarca* by Martens & Pfeffer.† Prompted by this, I suggested to Dr. Lamy, who was reviewing the genus, the propriety of withdrawing *Austrosarepta* as a synonym of *Lissarca*. He endorsed the idea,‡ as also did Dr. J. C. Verco.§ Whereas *Lissarca* was originally introduced as a subgenus of *Arca*, I would now recommend its transference to the Limopsidæ. The genus, which is chiefly Antarctic, now contains *L. miliaris* Philippi, 1845; *L. rubrofusca* Smith, 1879; *L. rubricata* Tate, 1886; *L. vivipara* Bernard, 1898; *L. picta* Hedley, 1899; *L. aucklandica* Smith, 1902; *L. rhomboidalis* Verco, 1907; and *L. notorcadensis* Melvill & Standen, 1907.

L. picta and *L. rubricata* seem to represent each the other in the Peronian and Adelaidean Regions respectively.

CHLAMYS RADIATUS Hutton.

Pecten radiatus Hutton, Cat. Marine Moll. New Zealand, 1873, p.82.

(Plate x., fig.28.)

This rare species has never been illustrated. Mr. E. R. Waite, Curator of the Christchurch Museum, has kindly lent me for study two imperfect specimens labelled by Prof. Hutton. The larger, 60 mm. high and 50 mm. long, is here figured. The species proves to be a particularly flat *Chlamys*, something like *C. serratus* Sowerby, but higher in proportion to length. The colour is buff to flesh-pink. About 20 ribs exceed the rest in size; between the primaries are intercalated three or four lesser riblets. All the

* Phil. Trans. R. S. London, clxviii. Pl.ix. f.17.

† Jahrb. wiss. Anst. Hamburg, iii. 1886, Pl.iv. f.14, a-e.

‡ Journ. de Conch. lv. 1907, p.291.

§ Trans. Roy. Soc. S. A. xxxi. 1907, p.221.

ribs carry small dense scales. Stewart Island is the type-locality, but the individual here drawn came from the Chatham Islands. *Ostrea radiata* of Gmelin was afterwards transferred to *Pecten*, but it does not seem to imperil the name of the present species.

PHOLAS AUSTRALASIE Sowerby.

Sowerby, Thes. Conch. ii. 1849, p.488, Pl.cvi. f.73.

Probably because it is absent in the immediate neighbourhood of Sydney, this species has escaped notice in literature as native to New South Wales. Nevertheless it is common, and generally distributed along the whole coast.

STRIGILLA SPLENDIDA Anton.

Tellina splendida Anton, Verz. M. Conch. 1839, p.5 ; Hanley, Thes. Conch. i. 1846, p.249, Pl.lvi. f. 39. *Strigilla splendida* Dautzenberg Fischer, Journ. de Conch. liv. 1906, p.226.

This species has not been recorded from Australia. Mr. P. G. Black gathered specimens on the beach at Townsville. My determination of these was confirmed by Mr. C. Gabriel, who compared Queensland specimens at the British Museum.

STRIGILLA EURONIA, n.sp.

(Plate ix., figs.22-23.)

Shell of medium size, subrhomboidal, compressed, rather thin, glossy, slightly inequilateral, ventral margin rounded, anteriorly and posteriorly truncate. Colour lilac, concentrically disposed in paler and darker zones. Smooth, except for the oblique scratches, which number thirty-six, commence at a short distance from the posterior margin, and suddenly terminate with great exactness at a perpendicular median line. The scratches are closer posteriorly, wider anteriorly, spreading apart from the umbo outwardly. The unscratched posterior end has fine concentric thread-sculpture. Length, 16; height, 14; depth of single valve 4 mm.

This species occurs, though rarely, as far south as Sydney. I frequently met with detached valves cast up on the sandy beach facing the ocean at Byron Bay, N.S.W. The example figured is from Moreton Island, Queensland.

The most northern point to which I have traced it is near Bundaberg, where Dr. T. May found it.

This species marks the first occurrence of its genus in Australia, and is contained in that section which Dr. W. H. Dall has named *Aeretica*.* It is most nearly related to *S. senegalensis* Hanley. In the absence of actual specimens, I had indeed named and distributed it as that species. Now that Dr. Lamy, of Paris, has kindly given me authentic specimens of *S. senegalensis*, I am able to distinguish the Australian from the African shell. The posterior side of *S. euronica* is shorter and more rounded, and its anterior part is smooth; whereas *S. senegalensis* anteriorly has fine sharp concentric grooves. In size and colour the two species also differ.

STRIGILLA GROSSIANA, n.sp.

(Plate ix., fig.21.)

Shell rather large and solid, compressed, ovate-cordate, inequilateral, rounded anteriorly, and produced posteriorly. Colour externally white, banded and suffused with pale pink or purple, umbo pink; internally brilliant geranium-pink, with a narrow white border. Sculpture anteriorly concentric, then flexed first up and down, passing at one-third of the length into the fine oblique lines which cover the central area, along a well defined radial line at three-quarters of the length, the sculpture turns at an acute angle upwards, curves round, and concludes as concentric. Over all the eccentric threads run minor regular concentric growth-lines. Length, 24; height, 21; depth of single valve, 5 mm.

This handsome and distinct species is represented by a single imperfect right valve, collected in Moreton Bay by Mr. George Gross, to whom it is dedicated. The exact locality is the inner

* Dall, Trans. Wagner Free Inst. Sci. iii. 1900, p.1038.

beach of the south end of Moreton Island, about half a mile north of the sandhills.

CHIONE CAPRICORNEA, n.sp.

(Plate ix., figs.24-25.)

Shell massive, tumid, ovate, umbo prominent, posterior margin subtruncate, anterior rapidly rounded. Colour either uniform cream, cream with a few scattered brown dashes, or broad radiating stripes alternately cream and brown, lunule usually brown, interior pale yellow. Sculpture: about 36 narrow smooth concentric ribs, which near the anterior side are apt to be dislocated or to end prematurely; those continuing become sharper and more crowded, posteriorly they widen out for three-quarters of the length, then close up to end abruptly at the escutcheon. The ribs are about one-quarter the width of their deeply rounded interspaces, which are ornamented by close engraved concentric lines varying from six to twelve per furrow. The furrows are also crossed by dense microscopic scratches which under magnification offer the pattern of a brick wall. Lunule deep, cordate; escutcheon narrow, both roughened by fine concentric lamellæ. Inner valve-margin finely crenulate except dorsally. Pallial sinus narrow, sharply angled. Length, 47; height, 40; depth of single valve, 17 mm.

Hab.—Mast Head Reef, Queensland; 20 fathoms.

Young shells of this species were mistaken for *C. toreuma* Gould. The adult valve, now described, came to hand after my paper on the Mast Head fauna was completed, and shows the species to be distinct. The young shells, as often happens in this genus, are rounder than the adult.

Chione toreuma Gould, and *C. embrithes* Melvill & Standen, are the nearest relations of the novelty. By its lunule it is intermediate between them, but its greater length in proportion to height distinguish it from either.

These two species present such difficulty that a brief discussion of them may be acceptable. I find *C. embrithes* to range from the Gulf of Carpentaria through Torres Strait to Moreton Bay.

But I have taken *C. toreuma* only at Green, Fitzroy, and North Barnard Islands (*i.e.*, about 17° S. lat.). Though alike in size, colour, shape, and sculpture, they are immediately separable by the lunule, that of *C. toreuma* being comparatively narrow and shallow, but that of *C. embrithes* broad and deeply excavate. Smith* united *Venus jukesi* Desh., and *V. sculpta* Desh., to the earlier *V. toreuma* Gould, and described the yet unnamed *embrithes* as a form of it. Hidalgo,† on the contrary, divided *C. toreuma* from *C. jukesi*. His reference to Reeve's figures conveys the impression that the deeply lunuled shell is *C. toreuma*, and the shallow lunuled one is *C. jukesi*. But an excellent figure of *C. jukesi*‡ overlooked by all authors, when contrasted with the figures of Gould, and of Melvill and Standen seems to me to support the union of *C. jukesi* to *C. toreuma*.

In describing *C. embrithes*, Melvill and Standen merely state that it was "Hitherto mixed up and confounded with *C. toreuma*,"§ without reference to any previous appearance in literature of their novelty.

CUNA PISUM, n.sp.

(Plate ix., figs. 26-27.)

Shell large for the genus, solid, inflated, globose-cuneate, inequilateral, produced posteriorly. Both lunule and escutcheon large, deeply impressed, smooth. Umbo usually eroded, bluntly rounded, approximate. Colour dull white. Sculpture: about thirty irregular concentric flat-topped ridges parted by narrow interstices. The anterior part of the valve carries half a dozen rays apparent through inflection of the concentric ribbing and gradually fading posteriorly. Ventral margin sharply finely crenulated. Length, 6; height, 5; breadth of conjoined valves, 4 mm.

One example dredged in 8 fathoms off Green Point, Sydney Harbour, by J. Brazier.

* Zool. Coll. Alert 1881, p.93.

† Mem. Acad. Cien. Madrid xxi. 1903, p.290.

‡ Deshayes, Proc. Zool. Soc. 1853 (1854), Moll. pl. xix., f. 2.

§ Journ. Linn. Soc. Zool. xxvii. 1899, p.195.

Type.—To be presented to the Australian Museum.

Since I last wrote on this genus, it has been reviewed and enlarged by Dr. Dall.*

CYAMIOMACTRA NITIDA, n.sp.

(Plate ix., figs 19-20).

Shell small, moderately solid, inflated, inequilateral, the anterior end rather pointed, the posterior truncate, very glossy. Colour rufous. Sculpture: the whole surface marked with faint and rather irregular concentric growth-lines, radial sculpture absent. The protoconch a distinct cap with a slightly thickened rim. Hinge contracted, the bifid cardinal projecting further than usual into the valve. Height 2.2; length 2.6; depth of single valve 0.9 mm.

In 20 fathoms, sand, five miles from Sussex Inlet, Wreck Bay, N. S. Wales, I dredged several living examples in December, 1905.

By its wedge-shape, lack of radial sculpture and hinge, this approaches nearest to the type of the genus. But it is contrasted with *C. problematica* by being much smaller, more inflated and glossy.

Since I reviewed this genus† an Antarctic member, *C. laminifera*, has been discovered by Dr. Lamy.‡ It seems to me probable that another Antarctic shell described as *Cyamium denticulatum*,§ can also be referred to this genus.

By the kindness of the Director of the British Museum and of Mr. E. A. Smith, I have been favoured with the loan of cotypes of rare unfigured gasteropods, and notes on others. From this source I have obtained the following information and illustrations of little-known Australian shells.

Mr. Smith writes (4 Nov., 1907) that he cannot now find the following five species in the British Museum Collection. Since

* Dall, Trans. Wagner Inst. Sci. iii. 1903, p. 1480.

† These Proceedings, xxx. 1905 (1906), p. 540.

‡ Lamy, Expedition Charcot, Moll. 1906. p. 11, Pl. i. f. 10, 11, 12.

§ Smith, Discovery Expedition, Moll. 1907, p. 3, Pl. iii. f. 4-4b.

neither figures nor types of these are extant they may well be abandoned.

MITRA INSIGNIS A. Adams, Proc. Zool. Soc. 1851 (1853), p.132, Raine Island, N. Queensland (Lieut. Ince). Type of subgenus *Aidone*.

ZIZIPHINUS NEBULOSUS A. Adams, *loc. cit.* p.168, Raine Island (Ince). *Trochus nebulosus* Forbes, Voy. Rattlesnake ii. 1852, p.366, Bass Strait, 40-45 fths.*

ELEUCHUS VULGARIS A. Adams, *loc. cit.* p. 171, Swan River, West Australia. "Perhaps only *E. iriodon*," E.A.S.

MONODONTA GRANULATA Gray, Append. King's Survey, ii. 1827, p.479.

PHASIANELLA PULCHRA Gray, *loc. cit.* p.481.

GIBBULA SULCOSA A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853), p.186; Ann. Mag. Nat. Hist. (2) xii. 1853, p.209.

This shell was, in the above description, reported by Adams as having been dredged by Mr. Jukes in 8 fathoms off Sir Charles Hardy's Islands, North Queensland. Such a circumstantial statement invites confidence, which in this cases is undeserved.

Angas continued the tale by announcing *G. sulcosa* from New South Wales.† Then Tenison-Woods traced it to Tasmania,‡ and Pritchard and Gatliff to Victoria.§

In correction, Tate and May refer the Tasmanian shell to *Gibbula picturata* Adams & Angas;|| while Verco identified the Victorian one as *Gibbula lehmanni* Menke.¶ Which shell from New South Wales was mistaken by Angas for *G. sulcosa* is not known to me.

* Included by Reeve (Conch. Icon. xiv. 1863, Ziziphinus, Pl. ii. sp. 7) as a synonym of *Z. ornatus* Lamarek.

† Proc. Zool. Soc. 1867, p.217.

‡ Proc. Roy. Soc. Tasm. 1877, p.42.

§ Proc. Roy. Soc. Vict. xiv. 1902, p.132.

|| These Proceedings, xxvi. p.404.

¶ Trans. Roy. Soc. S.A. xxix. 1905, p.172.

At my request Mr. E. A. Smith examined the type of *G. sulcosa* in the British Museum, and replied that it proves to be a variety of *G. ardens* von Salis, and the Australian habitat a blunder. *G. ardens* is a common and variable Mediterranean shell. Bucquoy, Dautzenberg, and Dollfus have reviewed it exhaustively in the "Mollusques Marins du Roussillon" (Fasc. ix. 1885, p.379), but the synonyms of Adams escaped their attention.

GIBBULA VENUSTA A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853), p.187.

This was ascribed by its author to Australia, but Mr. Smith relegates it also to a variety of *G. ardens* von Salis. In this case bad work bred no further evil.

CLANCULUS ALBINUS A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853), p.82; Pilsbry, Manual Conch. xi. 1889, p.160.

(Plate viii., fig.12.)

The "accessible information" on this species is valued by the latest monographer as "mere trash." Brazier has recorded that, in December, 1871, he found one specimen of this rare shell, with the apex broken, on the beach of Fitzroy Island, North Queensland.* This citation renders *C. albinus* an object of interest to Australian conchologists, and to facilitate its recognition a figure and description of a cotype from the British Museum are here given. Within the genus *Clanculus* the species should be intercalated near *C. clanguloides* Wood.

Shell large, very solid, deeply and rather widely false-umbilicate, globose-conic. Spire obtuse. Whorls about six in number, wound obliquely, slightly gradate, rounded at the periphery, a little descending and constricted at the aperture. Base rather flat, extending obliquely. Colour pale buff, punctate with small irregularly scattered crimson or brown dots. Sculpture: small

* Brazier, Journ. of Conch. ii. 1879, p.197.

grains of nearly uniform size are crowded in close spiral rows. On the last whorl are eighteen, on the penultimate seven, and on the antepenultimate six bead rows. Two or three spiral threads run along the shallow interstices which intervene between the rows. Aperture oblique, deltoid, choked by intrusions from right and left. From lip to lip a smooth thick but translucent callus spreads round the perforation. The very oblique columella arises deep within the perforation, and ends in a large projecting triplicate tubercle (the left intrusion); above the tubercle is a fold, and above that a small denticle. The opposite intrusion is a massive tricuspid rooted within the margin of the lip, and hanging deep into the aperture. On the palate between the perforation and right insertion are three short entering bars, followed by another winding far into the interior. Inside the periphery are three long entering infrapalatal ridges alternating with short ones at the entrance. Basal margin with half-a-dozen short transverse folds. Height, 18; maj. diam., 20; minor diam., 17 mm.

Greater size and paler colour are the features which separate *C. albinus* from *C. clanguloides* Wood.

MONODONTA SULCIFERA A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853) p.175.

The cotype of this unfigured species, lent me by the British Museum, represents an immature *Euchelus atratus* Gmelin.

CANTHARIDUS SUTURALIS A. Adams.

Thalotia suturalis A. Adams, Proc. Zool. Soc. 1851 (1853), p.173; Ann. Mag. Nat. Hist. (2), xii. Sept. 1853, p.204.

(Plate vii., fig.4.)

Shell small, solid, pyramidal, imperforate. Apex eroded, but whorls apparently six, flattened, slightly gradate, last descending a little at the aperture. Colour pale yellow, tessellated with small purple spots. Sculpture: low, flat-topped spiral ribs equal to the intervening spaces, on the last whorl twelve, of which half

are basal. Aperture subquadrate, terminating below in a blunt tubercle. Height, 8; maj. diam., 8; minor diam., 7 mm.

Adams states that the type was taken by Lieut. J. E. Dring at Cape Upstart, North Queensland, under stones at low water. I have taken a variety of this at Sweers Island, Gulf of Carpentaria.

CANTHARIDUS CRENELLIFERUS A. Adams.

Thalotia crenellifera A. Adams, Proc. Zool. Soc. 1851 (1853), p.173; Ann. Mag. Nat. Hist. (2), xii. Sept. 1853, p.204; Brazier, these Proceedings, ii. 1877, p.43.

(Plate vii., fig.5.)

The British Museum cotype is a small shell, conical, angled at the periphery and flattened on the base, the spire-whorls slightly bulging at their periphery. Whorls nine. Colour rose-red variegated by oblique flames of pale brown. Sculpture: the last and antepenultimate whorls have nine spiral strings, the outermost larger, apt to run in pairs and separated by spaces broader than themselves. They are crossed at a low angle by fine close threads which in their passage bead the strings and lattice the interstices. Base with half a dozen widely parted spirals; here the radials are finer and closer and chiefly affect the interstices. Aperture subquadrate, columella abruptly truncate anteriorly. Within the base of the aperture is a bilobed callus ridge, a sort of doorstep, and within the left margin another mass of callus. Length, 10; breadth, 7 mm.

The original description quotes the species from "Australia." Brazier records it from 25-30 faths. off Darnley Island, Torres Strait. A specimen from New Caledonia agrees well with the cotype before me. This suggests that the unfigured *Trochus artensis* Fischer* from New Caledonia may perhaps be a synonym.

* Journ. de Conch. 1878, p.208.

CANTHARIDUS STRIGATUS A. Adams.

Thalotia strigata A. Adams, Proc. Zool. Soc. 1851 (1853), p.172; Ann. Mag. Nat. Hist (2), xii. Sept. 1853, p.203.

Thalotia mundula Adams & Angas, Proc. Zool. Soc. 1864, p.37.

Trochus baudini Fischer, Journ. de Conch. xxvi. 1878, p.65; Coq. Viv. 1879, p.356, Pl.110, f.5 (not of Tate & May, these Proceedings, xxvi. 1901, p.460).

(Plate vii., fig.3.)

The cotype of *T. strigata* here figured is 18 mm. in length, painted with longitudinal stripes of white and red or green. The type-locality is Swan Point, near King's Sound, N.W. Australia.

Mr. Smith writes of *T. mundula*—"This is certainly only a young specimen of *T. strigata* A. Ad. We have the type of *mundula* presented by Angas, and I have very carefully compared it with *strigata*." The habitat of *T. mundula* is Shark's Bay, W. Australia.

I consider that *T. baudini* Fischer, was founded on a young *Thalotia strigata*. Prof. Tate assigned this name to a Tasmanian shell, but in this I cannot follow him; nor do I know any other Tasmanian shell which suits the figure of Fischer. The type of *T. baudini* was said to have been collected on King Island, Bass Strait; but there are other cases where shells from N.W. Australia are credited to Tasmania by the naturalists of the same expedition.

CANTHARIDUS PUNCTULOSUS A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853), p.169.

This species was reported to have been obtained by Jukes in 4 faths. Swan River, W. Australia; and has not been again noticed in literature. A cotype lent by the British Museum shows the species to be synonymous with *Trochus nitens* Kiener.

CANTHARIDUS MONILIGER A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1853), p.169.

Reported to have been obtained by Jukes in 8 faths. Swan River, W. Australia. I consider the cotype lent me to belong

to *Cantharidus pyrgos* Philippi, already discussed in these Studies.*

LIOTIA AFFINIS A. Adams.

A. Adams, Proc. Zool. Soc. 1850, p.50; Ann. Mag. Nat. Hist. (2) vii. April, 1851, p.332.

(Plate vii., figs.6-7.)

This unfigured species has been omitted from the last monograph, and indeed from subsequent literature generally. But it so closely approximates to the figure for *L. scalaroides* Reeve, given by Adams† himself as to suggest that the names are synonymous.

The cotype from the British Museum has, as usual, been sadly etched with acid. It may be described as follows:—

Shell very solid, subglobose, narrowly perforate. Colour (in present condition) white. Whorls five, the upper tabulate, the lower rounder, descending with greater obliquity as growth proceeds. Sculpture: the radials at last form oblique massive waves; advancing down the whorls they become wider-spaced, fewer and larger, so that the final whorl carries eight, including the varix, but the penultimate eleven. Conversely the spirals multiply while decreasing in comparative size; behind the aperture are 18 small threads, but on the antepenultimate 4 large ones. As each intercostal furrow runs into the umbilical border it ends in a small pit. On the base a solid broad callus overlies and swallows the ribs and surrounds the umbilicus. On the inner edge the radials reappear as denticles, below it merges into the peristome, above it winds as a screw-thread into the perforation. Aperture small, circular. Operculum similar to that figured for *L. peronii*.‡ Height, 10 mm; maj. diam. the same; minor diam. 9 mm.

The locality given is "Australia." What I recorded from Masthead Island as *L. scalaroides* agrees with it. It may be

* These Proceedings, xxvi. p.19.

† Genera Mollusca, Pl. xlv. f.5c.

‡ Proc. Zool. Soc. 1850, Pl. viii. f.19.

here mentioned that a cotype of *Liotia Walkeri** Sowerby, proves identical with *L. deveza* described in the fourth Part of these Studies.

DELPHINULA CORONATA A. Adams.

A. Adams, Proc. Zool. Soc. 1850, p.51; Ann. Mag. Nat. Hist. (2) vii. p.332.

(Plate viii., fig.13.)

This name was given to a shell gathered by Jukes at Cape Upstart, Queensland. The cotype lent me is obviously *D. delphinus* Linné var. *melanacantha* Reeve,† of which it may sink as a synonym. No subsequent writer appears to have noticed this species.

NASSA AUSTRALIS A. Adams.

(Plate viii., fig.10.)

Nassa australis A. Adams, Proc. Zool. Soc. 1851 (1853), p.272; Ann. Mag. Nat. Hist. (2) xiii., Feb. 1854, p.156.

This hitherto unfigured and unrecognised species was, in the above description, reported from "Australia." The cotype figured is 24 mm. in length. It appears to agree with fig.51 of *Nassa*, Conch. Icon. viii. This illustration is quoted by von Martens‡ for *Nassa marginulata* Lam., var. *hepatica* Pulteney.

MITRA DELICATA A. Adams.

(Plate vii., fig.1.)

Mitra delicata A. Adams, Proc. Zool. Soc. 1851 (1852), p.137; Ann. Mag. Nat. Hist. (2) xv. 1853, p.54.

The cotype lent me by the British Museum is figured and described as follows:—Shell slender fusiform, contracted at the base, spire acuminate slightly turreted. Remaining whorls 10. Colour milk-white with two narrow orange bands each covering about three spirals, one below the suture, the other on the peri-

* Proc. Malac. Soc. viii. 1908, p.16, Pl.i f.2.

† Conch. Syst. ii. 1842, Pl.211, f.4 and Pl.212, f.10.

‡ Journ. Linn. Soc. Zool. xxi. 1857, p.181.

phery, the latter is so divided by the on-coming whorl that part appears on the spire. Sculpture: radial ribs prominent, narrow, being less than half the interstice-breadth, polished, following one another up the spire but not with perfect regularity; on the base the radials break up into beads on the spirals, on the first whorl 12, on the last twice as many. Spirals interrupted by the radials and latticing their deep interstices by bars equal in breadth to the deep pits that separate them. On the penultimate whorl are eight spirals; on the last twenty, including two coarse irregular ones behind the canal. Plaits on the columella four, anteriorly decreasing in size but increasing in obliquity. Canal short, up-turned. Throat ribbed within by a dozen raised spiral cords which are wider spaced posteriorly. Length, 19; breadth, 7 mm.

The cotype is worn and faded; a better specimen from Darnley Island has three embryonic and eight adult whorls in a length of 16 mm. The apex is small, acicular, of three small glassy whorls, inclined to the main axis. On the base is a third orange band entering the aperture immediately above the columellar folds.

The type is stated in the original description to have been procured by Jukes in 8 fathoms, off Cape York, Queensland. The species was next found by the Chevert Expedition in 15 fathoms at Darnley Island;* and I took it in 1906 near the Hope Islands, in 5-8 fathoms.

MITRA ASPERULATA A. Adams.

A. Adams, Proc. Zool. Soc. 1851 (1852), p.136.

(Text-fig. 1).

This figure is from a photograph of the unique type in the British Museum, for which I am indebted to Mr. E. A. Smith. The original locality is merely "Australia." The tip of the spire is broken off, the length of the last whorl is 10 mm., greatest diameter 5.5 mm., and the probable total length 20 mm.



Fig.1.

* Brazier, these Proceedings i. 1876 (1877), p. 214.

COMINELLA MAURA A. Adams.

A. Adams, Proc. Zool. Soc. 1854 (1855), p.313.

The British Museum cotype easily falls within the variation-range of the protean *Cominella lineolata* Lamarck. This has already been conjectured by Tryon. The locality of Darnley Island, Torres Strait, is an obvious error, as the species does not range so far north.

PERISTERIA NODULOSA A. Adams.

A. Adams, Proc. Zool. Soc. 1854 (1855), p. 313.

(Plate viii. fig.11).

This species has not been figured or again noticed in literature. It was originally reported from Australia, but I am not acquainted with an Australian shell like it. It would seem to be related to *Pyrgula anomala* Reeve. The cotype received has been so severely etched with acid that the surface and upper whorls have gone. Shell massive, biconical, constricted on the base and below the suture. Five whorls remain. Heavy blunt nodules, about eight to the last whorl, are disposed in a peripheral row. Within the throat are seven entering lyræ. Base of the columella with an obscure tubercle or two. Canal short recurved. A funicular ridge extends from the canal backwards around a shallow axial perforation. Length 30 mm.; breadth 19 mm.

TEREBRA AUSTRALIS Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (4) xi. April, 1873, p.264.

(Plate viii., fig.2).

The original localities are Swan River, and Paterson's Bay, Torres Strait. The cotype figured is 43 mm. long, and 9 mm. broad.

PLEUROTOMA COGNATA Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (4), xix. June, 1877; p.490.

(Text-fig.2).

My figure is reproduced from a photo kindly sent by the author of the species. The unique type is reported from "Australia;" it is 24 × 7 mm.

DRILLIA ESSINGTONENSIS Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (6), ii. Oct. 1888, p.303.

(Plate viii., fig.8).

The cotype is rufous-brown, the peripheral tubercles touched with white. Length 19 mm., breadth 7 mm. I have seen this species from Torres Strait.



Fig.2.

DRILLIA VENTRICOSA Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (6) ii. Oct. 1888, p.301.

(Text-fig.3.)

My figure is from a photograph of the unique type, kindly forwarded by Mr. E. A. Smith. It is 27.5 mm. long and 9.5 mm. broad, and was dredged by MacGillivray between the Percy Group, Queensland, and the mainland.



Fig.3

CLATHURELLA MORETONICA Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (5) x. Oct. 1882, p.299.

(Plate viii., fig.14.)

The cotype is 10 mm. long, 3 mm. broad; of a uniform cinnamon-brown. It was taken in Moreton Bay, Queensland, by F. Strange.

DAPHNELLA SOUVERBIEI Smith.

E. A. Smith, Ann. Mag. Nat. Hist. (5) x. Oct. 1882, p.300.

(Plate viii., fig.9)

The cotype figured is white; 13 mm. long, and 6 mm. broad. It was reported from the Swan River, Western Australia.

BITTIUM TURRITELLIFORMIS [-E] Angas.

Angas, Proc. Zool. Soc. 1877, p.174, Pl.xxvi. f.14.

I suggested to Mr. E. A. Smith that my *Seila attenuata*, described in the first Part of these Studies, might be a synonym of the above species of Angas, if his figure and description could be construed with some latitude. Mr. Smith replied (i.vi.08)—“Angas never gave us any specimens, so perhaps he lost the type, being such a small object, or he may have returned it to Brazier. I think, however, that your shells are this species. Angas described the whorls as *convex*, so I regard the figure as inaccurate.”

Since the type of Angas' species is lost, and his figure and description are bad, there would be some justification for abandoning his species. I would, however, prefer to assume that he dealt with a young *attenuata* and to withdraw my name in favour of his.

S. attenuata has been recognised in Victoria by Pritchard & Gatliff.*

EXPLANATION OF PLATES VII.-X.

Plate vii.

- Fig.1.—*Mitra delicata* A. Adams.
 Fig.2.—*Terebra australis* E. A. Smith.
 Fig.3.—*Cantharidus strigatus* A. Adams.
 Fig.4.—*Cantharidus suturalis* A. Adams.
 Fig.5.—*Cantharidus crenelliferus* A. Adams.
 Figs.6-7.—*Liotia affinis* A. Adams.

* Proc. Roy. Soc. Vict. xviii. 1906, p.60.

Plate viii.

- Fig. 8.—*Drillia essingtonensis* E. A. Smith.
 Fig. 9.—*Daphnella souverbiei* E. A. Smith.
 Fig. 10.—*Nassa australis* A. Adams.
 Fig. 11.—*Peristernia nodulosa* A. Adams.
 Fig. 12.—*Clanculus albinus* A. Adams.
 Fig. 13.—*Delphinula coronata* A. Adams.
 Fig. 14.—*Clathurella moretonica* E. A. Smith.

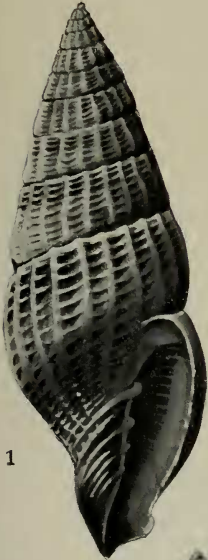
Plate ix.

- Figs. 15-16.—*Capulus nutatus* Hedley.
 Fig. 17.—*Mangelia hilum* Hedley.
 Fig. 18.—*Trophon paivae* Crosse, (apex).
 Figs. 19-20.—*Cyamiomactra nitida* Hedley.
 Fig. 21.—*Strigilla grossiana* Hedley.
 Figs. 22-23.—*Strigilla euronica* Hedley.
 Figs. 24-25.—*Chione capricornea* Hedley.
 Figs. 26-27.—*Cuna pisum* Hedley.

Plate x.

- Fig. 28.—*Chlamys radiatus* Hutton.
 Fig. 29.—*Eulima topaziaca* Hedley.
 Figs. 30-31.—*Litiopa melanostoma* Rang.
 Fig. 32.—*Odostomia ignava* Hedley.
 Fig. 33.—*Rissoa imbrex* Hedley.
 Fig. 34. ,, *procineta* Hedley.
 Fig. 35. ,, *praeda* Hedley.
 Fig. 36. ,, *incompleta* Hedley.
 Figs. 37-38.—*Vermicularia caperata* Tate & May.

Note.—On p. 456, lines 24-25, after *Buccinum funiculatum* Reeve, add
 (= *B. contractum* Reeve, fide E. A. Smith).



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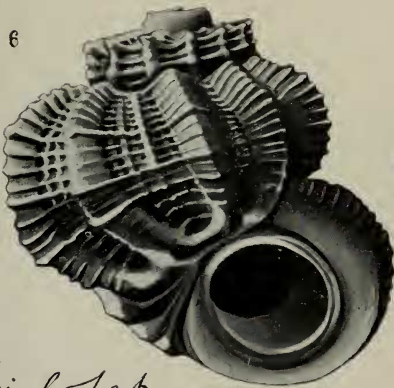
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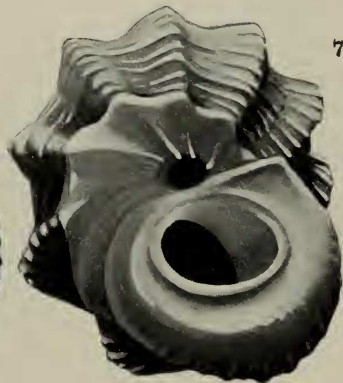
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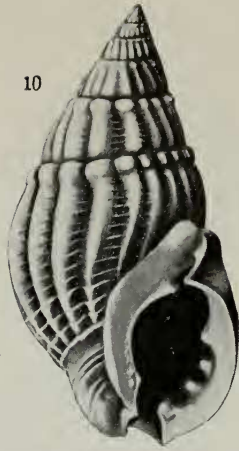
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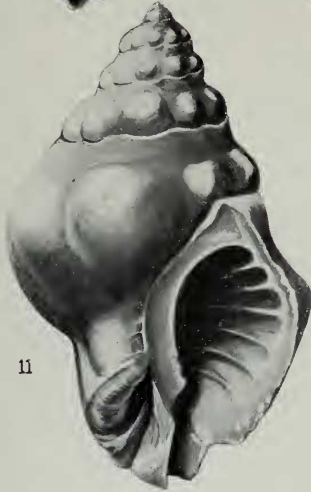
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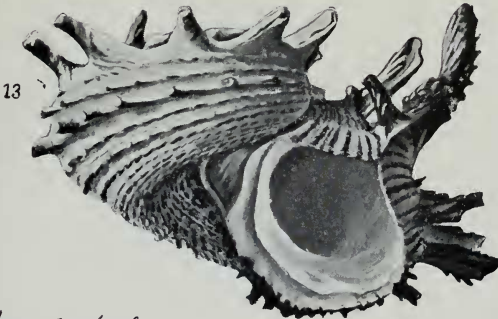
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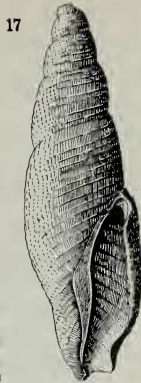


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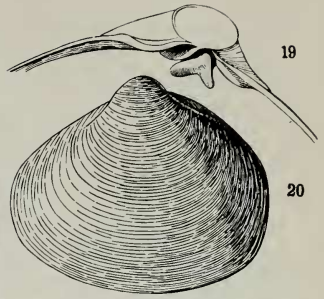
Wm. F. & W. S. C.



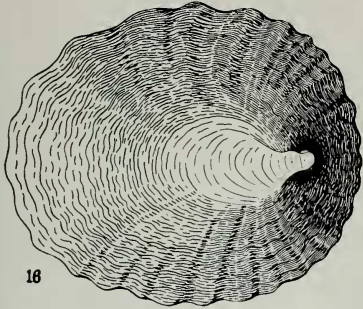
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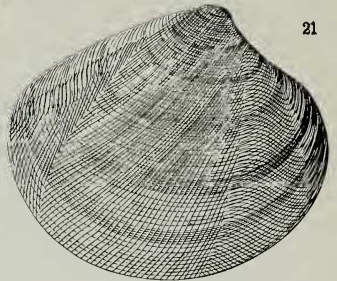
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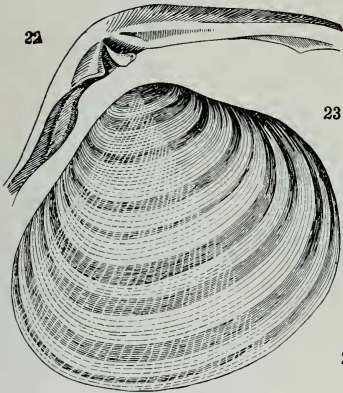
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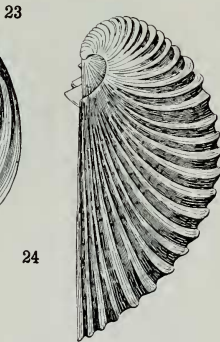
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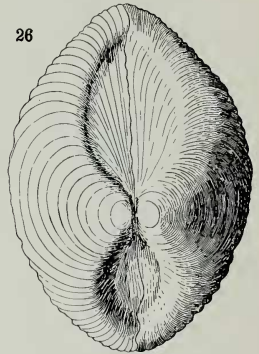


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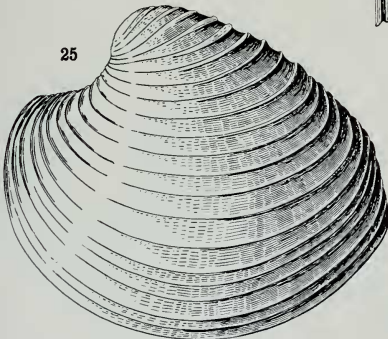


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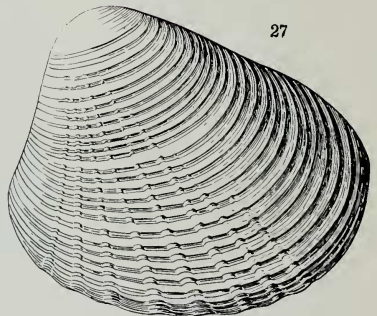
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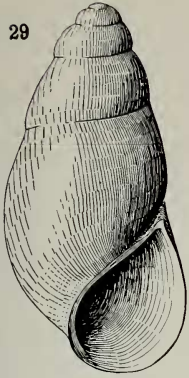
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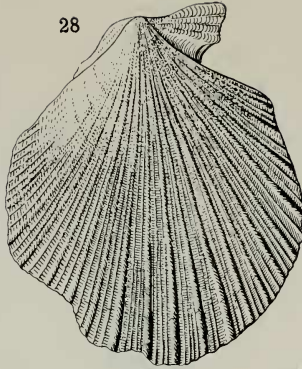
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C. Hedley del.

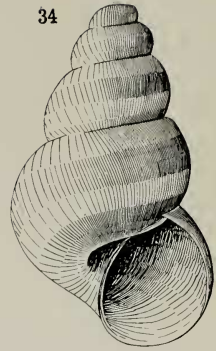
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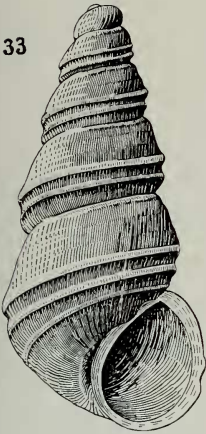
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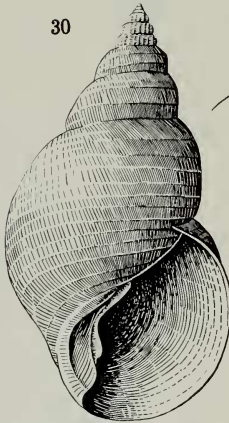
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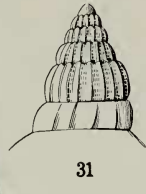
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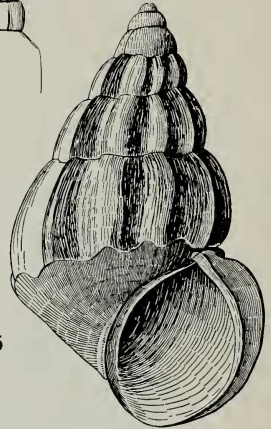
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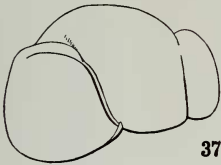
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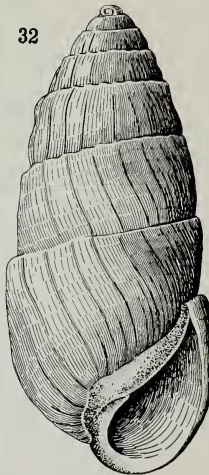
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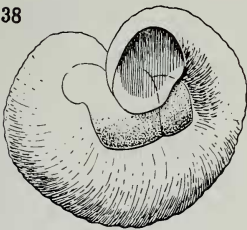
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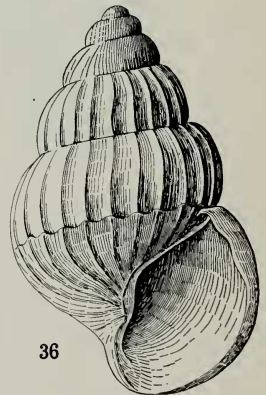
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FIG. 1.



FIG. 2.



FIG. 3.